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ALL THE WORLD'S A FRAGMENT

*Fragmentalism, Time, and Modality*

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*To Shan*

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# Introduction

This thesis is devoted to fragmentalism, a non-standard tense realism introduced by Kit Fine (2005).<sup>1</sup> Before we start, let me stress that I will not argue *for* fragmentalism here; I will simply assume it as a working hypothesis. Accordingly, I will tend to set aside the objections recently raised against it,<sup>2</sup> despite the fact that I find some of them convincing.

In the first three chapters, I will show how to develop a fragmentalist version of presentism – which I will call *fragmentalist presentism* – in order to face some of the problems usually ascribed to standard presentism. In particular, the goal of the first chapter (which is largely based on ‘Fragmentalist Presentism and the Correspondence Theory of

<sup>1</sup> See also Fine (2006).

<sup>2</sup> See, in particular, Tallant (2013), Correia and Rosenkranz (2012), Lipman (2015), and Deng (2013).

Truth’, an unpublished manuscript co-authored with Giuliano Torren-  
go) is to search for a way to reconcile the correspondence theory of truth  
(hereinafter, CTT), i.e., the thesis that truth supervenes on facts, with a  
presentist metaphysics. According to what I will call *unrestricted CTT*,  
the truth of past- and future-tensed sentences supervenes – respectively  
– on past and future facts. Since the standard presentist denies the exis-  
tence of past and future entities (and facts concerning them that do not  
obtain in the present), she seems to lack the resources to accept both  
past- and future-tensed true sentences and unrestricted CTT. I will ar-  
gue that by endorsing fragmentalist presentism one can uphold past- and  
future-tensed truths together with unrestricted CTT.

In the second chapter (a revised version of ‘The Invisible Thin Red  
Line’, another unpublished manuscript co-authored with Giuliano Tor-  
ren- go), I argue that the adoption of an unrestricted principle of bivalence  
is compatible with a metaphysics that (i) denies that the future is real, (ii)  
adopts nomological indeterminism, and (iii) exploits a branching struc-  
ture to provide a semantics for future contingent claims. To this end, I  
will show how to reconcile – within Fine’s non-standard tense realism –  
a genuinely A-theoretic branching-time model with the idea that there is  
a branch corresponding to the thin red line, that is, the branch that will

turn out to be the actual future history of the world.

Many four-dimensionalists think of continuants as mereological sums of stages from different times. These sums would perdure, that is, they would persist by having different stages. This view is generally taken to be incompatible with presentism: if there is no time except the present, then nothing can be a sum of such stages. The aim of the third chapter is to show that fragmentalist presentism provides us with the tools to reconcile a presentist metaphysics and (a non-standard version of) perdurantism.

In the last chapter, I will extend the fragmentalist approach to modality, by analysing the modal analogue of fragmentalist presentism. The simplest quantified modal logic is generally regarded as incompatible with actualism, the view that everything there is is actual. It is usually held that whoever wants to preserve the former while embracing the latter is somehow bound to enrich the inventory of the world with entities able to play the role traditionally ascribed to possibilia: abstract individualities or contingently non-concrete entities. I will hold that there is another way to reconcile actualism and the simplest quantified modal logic (a way that commits us to accept neither abstract individualities nor contingently non-concrete entities), by exploiting what we might call *fragmentalist actualism*.

# 1

## Fragmentalism, Presentism, and the Correspondence Theory of Truth

### 1.1 Presentism and the Correspondence Theory of Truth

Borrowing Fine (2005: 299)’s terminology, I will treat standard presentism as the conjunction of the following two theses:

*Ontic Presentism*    Only present entities exist.

*Factive Presentism*    Only tensed facts obtaining at present constitute reality.<sup>3</sup>

Consider the tensed fact that *Alan is sitting* – as opposed to the tenseless fact that *Alan is sitting at t*. In the light of factive presentism, if Alan is

<sup>3</sup> As Fine (2005: 300) underlines, while factive presentism is compatible with the negation of ontic presentism (notoriously, non-presentist ontologies such as the moving spotlight view and the growing block view maintain that presently obtaining facts are somehow privileged), ontic presentism makes sense only if factive presentism holds.

now sitting, reality is constituted by the fact that *Alan is sitting*. Under the hypothesis that it is true now that in a few minutes Alan will be standing, can the presentist accept the future fact that corresponds *now* to such a future-tensed truth? It depends on how we read ‘future fact’. A future fact in a *weak sense* is a future-tensed fact that obtains at present. If Alan will be standing in a few minutes, the fact that *Alan will be standing* obtains at present – and hence it constitutes reality now. A future fact in a *strong sense* is a present-tensed fact that will obtain in the future. If Alan will be standing in a few minutes (and he is sitting now), the fact that *Alan is standing* will obtain in a few minutes: it will constitute reality, which it does not now.<sup>4</sup> Hence, if factive presentism holds, the fact that *Alan is standing* does not constitute reality. In other words, it is incompatible with factive presentism to accept future facts in the strong sense; and analogously for past facts in the strong sense.

<sup>4</sup> For the distinction between weak and strong facts, see Ciuni and Torrenco (2013). Here I will focus on *tensed facts* only, which are the only kind of facts for which it makes sense to distinguish between facts that obtain in the present, in the past, and in the future. A tenseless fact such as the fact that *Alan is sitting at t* is such that either it does not make sense to talk about it as obtaining in the present rather than in the past or in the future, or it obtains indifferently in the past, in the present, and in the future.

Still, factive presentists can accept past and future facts in the weak sense, since they are facts that obtain at present. The correspondence theory of truth (CTT) states that truth supervenes on facts. According to what we could call *unrestricted CTT*, while the truth of present-tensed sentences supervenes on present facts, the truth of past- and future-tensed sentences supervenes, respectively, on past and future facts. If we read ‘past’ and ‘future’, respectively, as ‘past in the weak sense’ and ‘future in the weak sense’, then factive presentists seem to have the resources for maintaining unrestricted CTT. Past-tensed truths, as well as future-tensed ones, would be nothing but present truths supervening on presently obtaining past- or future-tensed facts.

However, accepting such past- and future-tensed facts is problematic for someone who also accepts ontic presentism, namely for a presentist *tout court*. If facts are complex entities – as most agree<sup>5</sup> – it seems that the most plausible candidates as constituents of past- and future-tensed facts are, respectively, past and future entities. If so, accepting that among the facts that presently obtain there are past- and future-tensed ones would entail accepting that past and future entities exist, contrary

<sup>5</sup> See Correia and Mulligan (2013).

to what ontic presentism holds.<sup>6</sup>

Notoriously, many versions of standard presentism are compatible with the acceptance of past and future facts in the weak sense. According the so-called “Lucretian” position (Bigelow 1996), for instance, the mereological sum of all the presently existing entities presently instantiates properties like *being such that Alan was sitting* or *being such that Alan will be standing*. Such properties, which are taken to be an irreducible part of reality, would provide a supervening base for the past-tensed truth that *Alan was sitting* and the future-tensed truth that *Alan will be standing* by being presently exemplified by that sum. No non-present entities would be required to allow the supervenience of truth upon being. Rather, past- and future-tensed truths would supervene on how the world is now, namely on past and future facts in the weak sense. Another option is to resort to the *haecceitist* version of ontic

<sup>6</sup> Of course, factive presentists who deny ontic presentism do not have a problem here. Nor may a presentist maintaining that facts are “simple” entities have a problem here, but of course her solution would be ontologically very costly. A further option may be to deny the existence of facts altogether. Note that, even though in this thesis I will use fact-talk, nothing prevents us from resorting to another ontological category, on the grounds of our preferred metaphysical view (as far as the entities so introduced are taken to instantiate fundamental properties and relations).

presentism, which treats past and future entities as uninstantiated “this-nesses” (Adams 1986), or to resort to what we could call non-serious ontic presentism, which thinks of past and future objects as Meinongian non-existent entities. Still another strategy is to hold that present truths together with laws of nature necessitate past- and future-tensed truths (Markosian 2013). This approach allows us to uphold the existence of a supervenience base for such truths without dropping ontic presentism (as far as we are willing to embrace some form of nomological determinism).

But all these options share a fundamental problem. If the past- and future-tensed facts are made up exclusively of entities that the presentist can accept (i.e., presently existing things and presently instantiated properties), she is bound to drop the requirement of “aboutness” regarding what tensed truths supervene on. In short, at the root of the aboutness objection against ontic presentism there is the idea that past- and future-tensed truths are *about* past and future entities and not presently existing things or present instantiations of properties (Merricks 2007: 137-138, Sanson and Caplan 2011). Therefore, if such truths have a supervening base then it must concern past and future entities respectively. But no version of standard presentism is compatible with accepting the existence of past and future entities, and so neither is compatible with



the requirement of aboutness. Dropping the requirement of aboutness while maintaining unrestricted CTT seems an *ad hoc* move, since the two theses justify each other. After all, why should we think that truths modally co-vary with facts, if we do not care about the relation between what true propositions are about and the facts their truth supervenes on? The combination of standard presentism and unrestricted CCT proves to be highly problematic.

What about non-standard versions of presentism? As we will see, non-standard presentists radically modify our understanding of both ontic presentism and factive presentism. I will argue that, within the non-standard framework that Kit Fine (2005) calls *fragmentalism*, the presentist can finally accept past and future facts *in the strong sense*, so reconciling unrestricted CTT and ontic presentism.

## 1.2 Fragmentalist Presentism

Factive presentism can be thought of as the standard form of tense realism, that is, the tenet that irreducibly tensed facts constitute a coherent reality in an absolute sense. Turning to a slightly more precise framework, I will follow Fine in treating standard tense realism as the conjunction

of the following three theses (2005: 271):<sup>7</sup>

*Realism*      Reality is constituted (at least, in part) by tensed facts.

*Absolutism*    The constitution of reality is an absolute matter, i.e. not relative to a time or other form of temporal standpoint.

*Coherence*    Reality is not contradictory, it is not constituted by facts with incompatible content.

As Fine underlines, these claims are jointly incompatible with the idea that facts obtaining at any time constitute reality in the same way, namely the following thesis (p. 271):

*Neutrality*    No time is privileged, the tensed facts that constitute reality are not oriented towards one time as opposed to another.

Without going into the details, it is easy to see that Realism, when coupled with Absolutism and Coherence, gives rise to a version of McTaggart (1908)'s Paradox in the presence of Neutrality. If some qualitative variation through time occurs, reality will be constituted by incompatible tensed facts. Suppose for example that at  $t$  Alan is sitting, while at  $t_1$  he is standing. In the light of Realism, at  $t$  the tensed fact that *Alan*

<sup>7</sup> See also Fine (2006: 399-400).

*is sitting* obtains, while at  $t_1$  the tensed fact that *Alan is standing* obtains. Assuming both Neutrality and Absolutism, those two incompatible facts will constitute reality absolutely speaking and not with respect to a given time. But, under the hypothesis that Coherence holds, reality cannot contain incompatible facts (Fine 2005: 272).

Standard forms of tense realism reject Neutrality. Standard presentism, as we saw, rejects it in favour of factive presentism (and ontic presentism). If the present time is privileged, only the facts that obtain at present constitute reality. Thus if Alan is sitting and then is standing, it won't be the case that the fact that *Alan is sitting* and the fact that *Alan is standing* will both constitute reality.

Non-standard forms of tense realism maintain Neutrality, while giving up either Absolutism or Coherence. Those who reject Absolutism embrace what Fine (2005: 278-279) calls *external relativism*. External relativists think of reality as a plethora of *perspectives*, each centred on a time, and the constitution of reality by tensed facts as irreducibly relative. The crucial point is that incompatible tensed facts constitute reality only relative to different perspectives, and there is no overall perspective encompassing all of them (such a perspective would be incoherent).

Those who reject Coherence, while keeping Absolutism, adopt *frag-*

*mentalism* (pp. 280-281).<sup>8</sup> The fragmentalist gives up the assumption that reality is “of a piece”. Namely, she maintains that it is divided up into maximally coherent collections of tensed facts, called *fragments*. While each fragment is taken to be internally coherent, the whole of reality is not. In other words, reality would be constituted by irreducibly incompatible facts, even though such facts can never obtain within the same fragment (p. 281). Suppose for instance that Alan is now sitting and then standing. The fragmentalist will describe this case by referring to two different fragments, one containing all the tensed facts that obtain when the fact that *Alan is sitting* obtains, and another one containing all the tensed facts that obtain when the fact that *Alan is standing* obtains. The fact that *Alan is sitting* and the fact that *Alan is standing* constitute reality in an absolute sense, but there is no fragment in which they obtain together. In the fragmentalist idiom: ‘*within fragment  $F_m$ , the fact that *Alan is sitting* obtains*’, and ‘*within fragment  $F_n$ , the fact that *Alan is standing* obtains*’.

While for the standard tense realist obtainment in the present is obtainment *simpliciter*, to the fragmentalist there is no obtainment *simpliciter*, but only *within a fragment*; yet (contrary to what the external

<sup>8</sup> For a critique of Fine’s classification see Correia and Rosenkranz (2012).

relativist maintains) constitution is understood as absolute. Thus, properly speaking, past and future facts in the strong sense *are* facts, since they constitute reality (even if they do not obtain at present). Note that in the fragmentalist picture the absolute constitution of reality and the limited obtainment of tensed facts are understood as two *metaphysically fundamental features*. As a whole, reality is incoherent; nevertheless there is no instance of a “conjunction” of incoherent facts, since along the temporal dimension reality is divided up into fragments constituted by facts that cohere with one another.

Among the forms of non-standard tense realism, I will focus on what I call *fragmentalist presentism*.<sup>9</sup> It is clear that a presentist who endorses a non-standard version of tense realism must reject factive presentism, which is incompatible with Neutrality, the idea that no time is privileged. In particular, according to the fragmentalist variety of non-standard theories, facts that obtain at times different from the present constitute reality in the same sense as facts that obtain at the present time (i.e., absolutely). However, within each fragment not all such facts obtain,

<sup>9</sup> In Fine’s paper, non-standard versions of tense realism are discussed, but the idea of ontic presentism in a non-standard framework is not articulated. Non-standard tense realism is explored also in Pooley (2013) and, more recently, in Tallant (2015).

otherwise fragments wouldn't be internally coherent. In other words, not all facts that constitute reality obtain in all fragments. A non-standard tense realist can exploit this idea to adapt the gist of the presentist position to fragmentalism, by embracing a version of ontic presentism (OP) and factive presentism (FP) within each fragment:

*Fragmentalist OP*    Within each fragment, only present entities exist.

*Fragmentalist FP*    Within each fragment, only presently obtaining facts obtain.

Someone may reply that fragmentalist presentism is not a genuine version of presentism, since facts about the existence of past and future entities do compose reality. But in so far as fragmentalism is a *non-standard* form of tense realism, this objection is unfair. The ontology which a tense realist is committed to depends on the (tensed) facts about existence that she accepts, i.e., that she accepts as obtaining. Now, while in the standard framework obtainment is absolute and for a presentist facts about existence change as time goes by, in the fragmentalist framework obtainment is irreducibly limited to a given fragment – so that reality does not cohere with respect to what exists.<sup>10</sup>

<sup>10</sup> One may have the worry that fragmentalism entails some form of commitment

Now, suppose that within a fragment we find both the present-tensed fact that *there are no outposts on Mars* and the future-tensed fact that *there will be outposts on Mars*, while in a different fragment we find the present-tensed fact that *there are outposts on Mars*.<sup>11</sup> All such tensed facts constitute reality, but they do not all obtain in a single fragment. Within the first fragment, future outposts on Mars do not exist at all; hence, only future facts “about” them in the weak sense obtain. The corresponding future facts in the strong sense are to be found in the second fragment, in which we find outposts on Mars as presently existing entities too, and no past facts about the absence of outposts on Mars in to non-existing objects in order to avoid contradictory talk, but this is not so. While present-tensed facts about the first child born in the next century constitute reality as much as the present-tensed fact that she or he does not (yet) exist, it is not the case that she has a certain property *and* she does not exist, since facts about her non existence never obtain in the same fragments where facts about her having certain (present-tensed) properties obtain.

<sup>11</sup> In order to keep things simple, in this chapter I take the future to be linear. I will discuss how to develop a tree-like structure of fragments in the next chapter (sections 2.2 and 2.3). In the meanwhile, those who embrace a branching time model can reformulate the arguments presented here by employing only past-tensed sentences as examples. Likewise, I set aside any complications due to relativistic considerations as immaterial to my main point.

the strong sense obtain.

### 1.3 The Argument from Truth

In order to see how fragmentalist presentism is compatible with the idea that past- and future-tensed truths supervene on past and future facts in the strong sense, I will summarise Fine (2005: 288-298)’s discussion of the so-called “argument from truth” against tense realism (due to Mellor 1986, 1998), and I will examine the solutions that both external relativism and fragmentalism provide.

Consider someone who makes an utterance,  $u_1$ , of the sentence ‘Alan is standing’ now while Alan is standing, and who has made an utterance  $u_2$  of the same sentence earlier, while Alan was sitting. It seems correct to say that  $u_1$  is true, while  $u_2$  was false. Assume that both  $u_1$  and  $u_2$  state the tensed proposition that Alan is standing, which – like all tensed propositions – does not encode information about the specific time of its occurrence. Finally, suppose that the following general principles hold (Fine 2005: 289-291):

*Truth-Value Stability* If an utterance is true (false), then it is always true (false).

*Content Stability* If an utterance states that  $P$ , then it always states



that  $P$ .

*Link*                      An utterance is true if and only if what it states is verified by the facts.

*Relevance*             A tensed utterance is only verified with the help of tensed facts.

The argument from truth aims to show that these four principles give rise to contradiction. Let us see how. Given that  $u_1$  is true and states the proposition that Alan is standing, by the left-to-right direction of Link, there are facts,  $f_1, \dots, f_n$ , that verify that Alan is standing, and given Relevance those facts are tensed. Since  $u_2$  stated the proposition that Alan is standing, by Content Stability,  $u_2$  states that Alan is standing. Given that  $f_1, \dots, f_n$  verify that Alan is standing, by the right-to-left direction of Link,  $u_2$  is true. But *ex hypothesi*  $u_2$  was false and hence, by Truth-Value Stability,  $u_2$  is false.<sup>12</sup>

<sup>12</sup> Clearly, the tense anti-realist has no need to face this conundrum, since she rejects Relevance (Fine 2005: 295). According to her, tensed claims, even granting that they express tensed propositions (i.e., even granting Content Stability), are verified by tenseless facts. Assume that  $u_1$  takes place at time  $t_1$  and that it is true. The fact that verifies it is the fact that *Alan is standing at  $t_1$* . Generally speaking, for any utterance  $u$  of a tensed sentence  $S$ , the anti-realist will identify a *tenseless fact* able

The standard solution for the tense realist (e.g. Priest 1987) consists in denying Truth-Value Stability. Fine has arguments against a solution of this kind, which we do not need to consider here. What I am interested in is the non-standard solution which he defends, and which consists in denying Link and endorsing Relative Link instead (p. 295):

*Relative Link* An utterance is true if and only if what it states is verified  
by the facts that obtain at the time of utterance.

Again, in the spirit of the non-standard construal of tense realism, the assumption that there is a single coherent reality is dropped. Consequently, there is no single set of facts that verifies any utterance. What *Relative Link* states is that the reality and the appropriate set of facts for verifying an utterance vary with the utterance. According to the relativist version of tense realism, facts never belong to reality in an absolute manner, but only relative to a temporal perspective or another. And only the ones belonging to the perspective of an utterance  $u$  can verify

to verify the proposition expressed by  $u$  – depending both on the time of utterance and on the tense in  $S$ . Since  $u_1$  and  $u_2$  are utterances of the same (present-tensed) sentence, but they occur at distinct times, the tenseless facts that verify  $u_1$  are not facts that can verify  $u_2$  as well. Therefore, neither Truth-Value Stability nor Content Stability will rise problems in presence of Link (p. 295).

the proposition expressed by *u*. According to the fragmentalist version, facts belong to reality absolutely speaking, but they do not constitute a coherent reality, since they do not always obtain conjointly. Given two facts that constitute reality, it may be that they do not obtain together, but only within two distinct fragments.

I claim that, in order to adapt Fine's non-standard solution to the argument from truth, the fragmentalist presentist can replace *Link* with the following:

*Fragmentalist Link* An utterance is true if and only if what it states is  
verified by the facts that obtain within the fragment  
in which the utterance takes place.

As I repeat, even granting that fragmentalism maintains that facts constitute reality all in the same sense, it does not follow that, if two facts belong to reality, then they both obtain in the same fragment. Thus, the presentist version of fragmentalism posits that the facts able to verify a given utterance belong to the fragment in which the utterance obtains. In other words, whether or not an utterance is verified is relative to the fragment in which it takes place.

Note that from a metaphysical point of view to say that a given fact verifies an utterance is to say that *the fact grounds the truth of*

*that utterance*. More precisely, the truth of the utterance is grounded in the facts obtaining within the fragment which the utterance belongs to. Thus, in the light of the presentist framework I am describing, given a true utterance the grounding relation is always limited to the fragment in which the utterance takes place. This is not surprising; after all, we are exploring a presentist metaphysics, albeit a non-standard one. Limiting the grounding relation to the fragment in which the utterance takes place is justified by the very idea at the root of presentism: nothing but the present exists, and so nothing but the present can function as a ground. In the fragmentalist idiom: within a given fragment nothing but the present exists; then, for each true utterance obtaining within it, nothing but the fragment itself can function as a ground.

For example, a true utterance *u* of ‘Alan will be standing’ is verified by the future-tensed fact that *Alan will be standing*, which obtains in the same fragment in which *u* takes place. In general, it is future facts *in the weak sense* that ground the present truth of true future-tensed utterances. Analogously, it is past facts *in the weak sense* that ground the present truth of true past-tensed utterances.

### 1.4 Topic and Target

The discussion of the fragmentalist solution to the argument from truth might seem to have led us to a dead end. We were looking for a connection between true past- and future-tensed propositions and past and future facts in the strong sense within a non-standard framework, in order to account for the supervenience of the truth of the former on the latter. But we ended up with a link – a grounding relation – between past- and future-tensed propositions and the facts that obtain in the fragments in which the utterances that express them take place. And given that fragmentalist factive presentism tells us that within each fragment only presently obtaining facts obtain, such facts can be past or future facts only *in the weak sense*, as noted at the end of last paragraph.

However, the fact that Fragmentalist Link does not make reference to facts that do not obtain in the present, and hence to past and future facts in the strong sense, is not incompatible with the claim that past and future facts in the strong sense are *the supervenience base* of the truth of past- and future-tensed propositions. As should be clear from the above discussion, according to fragmentalism, reality is constituted by all facts that obtain within any of the fragments, even though there is no global perspective from which we can say that all facts that belong

to reality obtain. In Fine (2005: 297)’s words: “In stating that a fact belongs to reality, we adopt a general perspective, but in stating that a fact obtains, we adopt the current perspective”. Note that what Fine here calls the “general perspective” is *not* a perspective or a fragment in the sense explained above. If there were such a general perspective in which all facts that constitute reality obtain, it would contain facts that are incompatible. But even in the absence of such a global perspective, present-tensed facts may co-vary with facts about the truth-value of past- or future-tensed utterances as required by a supervenience relation between past- and future-tensed utterances and the past and future facts in the *strong* sense which they correspond to. So, for instance, if no fact that *Alan is standing* were to obtain in some of the fragments that come “after” the fragment  $F$  within which an utterance  $u$  of ‘Alan will be standing’ takes place,  $u$  would not be true in  $F$ .<sup>13</sup>

Someone might now object that, much as the grounding relation, supervenience cannot hold between two different fragments, for – as I have just underlined – there is no general perspective that can function

<sup>13</sup> This consideration requires that  $F$  be somehow ordered in a “temporal” sequence. I will explain how to order the fragments by exploiting a “pseudo-earlier-than” relation in the next chapter (sections 2.2 and 2.3).

as a metaphysical “bridge” between them. It follows that we cannot find a supervenience base for past- and future-tensed propositions in a fragment different from the one in which the utterances expressing them take place. My reply is that, while a grounding claim expresses a relational “second order” fact (i.e. the fact that a fact  $f_1$  grounds a different fact  $f_2$ ), a supervenience claim expresses a mere modal correlation between facts, or between certain facts and the truth-values of certain claims. More specifically, the set of facts  $S$  that constitutes a supervenience base for a set of truths  $T$  are the facts such that, for each truth  $p$  in  $T$ , it is impossible to have a change in the truth-value of  $p$  without having a corresponding change in some of the facts in  $S$ . If there is supervenience between facts in different fragments, it does not follow that there is a fact binding the different fragments in an incoherent whole; supervenience just requires that, *within each fragment*, the facts co-vary as described.

Therefore – at least in principle – in a fragmentalist framework it is perfectly coherent to claim that the present truth of a past- or future-tensed proposition supervenes on the facts that obtain in a fragment *different* from the one in which the utterance that expresses the proposition takes place.<sup>14</sup> But how can we couple such a claim with Fragmentalist

<sup>14</sup> In order to avoid to be overly pedantic, sometimes I talk of true utterances

Link, which states a verification link between a true utterance and the facts that obtain in the fragment in which the utterance takes place?

My strategy is to insist that the facts that verify an utterance expressing a true proposition *are not necessarily* those to which the proposition it expresses corresponds. The problem, then, is to distinguish between the verification link and the correspondence link.

In fact, correspondence and verification cannot be identified (not even extensionally). As I have underlined in the first paragraph, I intend the correspondence between true propositions (that are expressed by tensed utterances) and facts to entail a supervenience relation between those two terms. And I have just pointed out that the facts in the supervenience base of a proposition  $p$  do not need to obtain within the fragment in which an utterance  $u$  that expresses  $p$  takes place. But the verification relation, as stated in the various versions of the Link theses in the previous paragraph, is a relation between an utterance  $u$  that expresses a true proposition and a set of facts that obtain in the fragment in which  $u$  takes place.

instead of true propositions, and vice versa. The relation between the two should be clear: an utterance  $u$  takes place within a fragment  $F$  and expresses a proposition  $p$ , and  $u$  is true if and only if  $p$  is verified by the facts that obtain within  $F$ .



That might seem puzzling: it is clear from the discussion of the argument from truth that the verification relation is not a merely epistemic link between evidence and true utterances: it is rather a grounding relation between the truth of the utterances and a given set of facts. Hence, it would be strange if the facts that verify an utterance are not *also* facts upon which the truth of the proposition expressed supervenes; if only because the verification link (as the correspondence link) is, strictly speaking, stronger than a supervenience relation (it entails it without being entailed by it; see Rodriguez-Pereyra 2005: 19).

I completely agree: the past and future facts in the weak sense that obtain in the fragment in which the utterance takes place modally covary with the truth of the utterance, as we should expect in a case of supervenience. If in a fragment  $F$  the present utterance  $u$  of ‘Tomorrow it will rain’ is true, Fragmentalist Link tells us that within  $F$  the fact that *tomorrow it will rain*, which verifies  $u$ , presently obtains. But if  $u$  were not true, that future fact would not presently obtain within  $F$ . However, the correspondence relation requires only that the supervenience base of a true proposition  $p$  is a set of facts such that it is impossible to have a difference in truth-value of the proposition without having a corresponding change in some of the facts in the set. The set of facts that verify the

utterance  $u$  that expresses  $p$  is one such set, *but it is not the only one*. It may be, and probably is, the only one containing only facts that obtain within the fragment in which  $u$  takes place. But there is a set of facts among those that do *not* obtain within the fragment in which  $u$  takes place which are obvious candidates for providing a supervenience base for the truth of  $p$  as well: intuitively speaking, the present-tensed facts that obtain in the fragment in which the time the utterance is talking about is present.

I will exploit another distinction in Fine's paper to make this point more precisely: that between the *topic* and the *target* of a tensed utterance. Roughly, the strategy will consist in adopting the following thesis:

*Topic-correspondence* The facts that correspond to a true proposition are those individuated by the topic of an utterance that expresses it.

Intuitively, each fragment is a present time, and from its perspective (the current perspective) there are future and past facts only in the weak sense, and no past or future entities. At least some of the fragments contain facts concerning utterances presently obtaining. An utterance  $u$  takes place in a fragment if and only if the fact that  $u$  is presently occurring obtains within it. As I have noticed, although only facts obtaining

within the fragment in which  $u$  takes place verify  $u$ , reality is constituted by facts that obtain within other fragments too. The fragment in which an utterance  $u$  takes place is the *time of utterance* of  $u$ . An utterance  $u$  is about the time at which it takes place in the sense that the fragment  $F_m$  in which  $u$  takes place is its *target*. The target of a true utterance  $u$  is the fragment  $F_m$  in which we find

[the] facts that constitute how things are at the time [...] that are relevant to determining whether the utterance is true. Normally there is no need to be explicit about the target of an utterance, since there is only one reality to which it can be directed. But once we adopt a non-standard form of realism, the target is no longer exogenously determined and must be regarded as a function of the utterance itself. (Fine 2005: 296)

In other words, the target of an utterance  $u$  of a future-tensed sentence is the fragment  $F_m$  in which the facts that verify the utterance obtain. According to Fragmentalist Link those are only presently obtaining facts. Thus, the target can contain only future facts in the weak sense. But according to the fragmentalist reality is constituted by all other facts too: among them we find the future facts *in the strong sense* that constitute the *topic* of  $u$ . We can think of the topic of  $u$  as the fragment  $F_n$  where the

fact which the proposition expressed is about obtains *in its present-tensed form*. If the proposition is present-tensed, the topic  $F_n$  will be identical to the target  $F_m$ , that is, the fragment in which a true utterance  $u$  takes place will be also the one containing the facts that correspond to the truth expressed by  $u$ . But if a true utterance  $u$  is past- or future-tensed, the fragment in which  $u$  takes place will not in general contain the facts that correspond to it.

Therefore, Topic-correspondence entails that the facts that correspond to a true proposition  $p$  are not necessarily confined to those obtaining within the target  $F_m$  of the utterance  $u$  that expresses  $p$ . There is clearly a relation of supervenience between the facts obtaining in the topic-fragment  $F_n$  and the truth of  $p$ . If an utterance  $u$  of ‘Tomorrow it will rain’ that takes place in a target-fragment  $F_m$  expresses a true proposition  $p$ , then Fragmentalist Link tells us that within  $F_m$  there obtain future-tensed facts that verify  $u$ , and Topic-correspondence tells us that, in the topic-fragment  $F_n$ , there obtain present-tensed facts that correspond to the true proposition  $p$  that  $u$  expresses. But if  $p$  were not true, not only would the future-tensed fact that *it will rain tomorrow* not obtain within  $F_m$ , but neither would the present-tensed fact that *it is raining* obtain in the topic-fragment  $F_n$ . In other words, there is a

modal correlation typical of a supervenience link between the present-tensed facts occurring at present in the topic-fragment and what is true about the future in the target-fragment in which the utterance is made.

Of course, within a fragment  $F_m$  in which a past- or future-tensed true utterance  $u$  takes place, the facts that constitute the topic of  $u$  will not generally obtain. And one may be suspicious about supervenience relations between facts that obtain (those concerning the truth of the proposition) and facts that do not obtain (those in the topic-fragment). But note that, even within  $F_m$ , those facts belong to reality. Fragmentalism, unlike externalist relativism, has it that facts belong to reality *in an absolute sense*. Hence, if they obtain within one fragment or another, they will belong to reality absolutely speaking.

Finally, we can now see how the fragmentalist presentist can accept past and future facts in the strong sense as what corresponds to the true propositions that she is willing to accept. In the fragmentalist version, CTT entails that what is true in a target-fragment supervenes on the facts that obtain in the corresponding topic-fragment. Thus, if in a fragment  $F_m$  an utterance  $u$  of ‘Tomorrow it will rain’ takes place and expresses a true proposition  $p$ , what corresponds to such a true proposition is the present-tensed fact that *it is raining*. This fact is future in the *strong*

*sense*, since it is present-tensed and it will obtain in the future. But even if within  $F_m$  it does not obtain, it can be what the true proposition  $p$  corresponds to, since it belongs to reality all the same.

## 2

# Fragmentalist Presentism, Branching Time, and Bivalence

### 2.1 Presentism and Bivalence

Presentism maintains that neither the past nor the future is real. It follows that there is no ground for future contingent claims. Those who agree with this line of thought, while holding that for every true claim there are facts in virtue of which the proposition it expresses is true, may be tempted to think that future contingent claims are neither true nor false, and thus to deny that the principle of bivalence holds unrestrictedly.<sup>15</sup>

<sup>15</sup> See, for instance, Bourne (2006). In a similar vein, Le Poidevin (1991: 38) observes that “[t]he extent to which the principle of bivalence is violated by statements about the past or future depends, for [the presentist], upon how much causal determinism he is prepared to allow. [...] In an indeterministic universe [...] many

Of course, two ways to reconcile the former and the latter present themselves quite naturally. Unfortunately, both come with a certain theoretical cost. The first option is to endorse nomological determinism. If present truths, together with the laws of nature, necessitate future tensed truths, there is no reason to deny a determinate truth-value to future contingent claims (Markosian 2013). But the issue of nomological determinism vs. nomological indeterminism is an empirical one, and it would be nice to find out whether the presentist could save bivalence even if the universe we happen to live in turns out to have indeterminist laws. Therefore, in what follows, I will assume that nomological indeterminism holds and will not discuss this option further.

The second option is to introduce in the present reality a fundamental ground for the truth of future contingents. The presentist could introduce in her metaphysics “brute facts” about which history among all the nomologically possible alternatives will be the actual one. If we represent statements about the future must [...] lack a truth-value”. To some extent, such a position might be thought of as sympathetic to Markosian (2013: 137)’s one. The latter seems to think that within a presentist framework, if laws of nature turned out to be wildly indeterministic, it would be impossible to evaluate contingent truths about the past as true or false; and, I add, similar considerations could be easily applied to future contingent claims.



sent, as is customary, nomologically possible histories through a tree-like structure, such brute facts would signal out a *thin red line* among all future branches – i.e. the branch that will turn out to be the actual future history of the world.<sup>16</sup> Needless to say, such a move would be very costly from a dialectical point of view, since it would commit us to inflate the present with facts that the non-presentist can easily exclude from her inventory of the world.

Eternalism seems to be better off, at least in its B-theoretic – i.e., tense anti-realist – version. Within a B-theoretic framework, every future fact is future in the strong sense. Now, under the hypothesis that time branches towards the future, the B-theoretic model can be interpreted in two different ways. According to the first one, the eternalist block of

<sup>16</sup> See Prior (1967). Linear time is compatible with indeterminism, but it is usually argued that to vindicate the intuition that the future is open we need branching and bivalence failure (Belnap, Perloff and Xu 2001, Belnap 2005, 2007, Borghini and Torrenço 2012). See Barnes and Cameron (2009) and Benovsky (2013) for a criticism of the idea; see Torre (2011) for an overview. Here, I am not interested in whether branching or branching together with a thin red line vindicate any alleged intuition about the openness of the future. Rather, my aim is to show that bivalence and fragmentalist presentism are compatible even on the assumption of nomological indeterminism and branching time.

tenseless facts is taken to be a block *multiverse*. In this case, facts located in different branches will all obtain in different alternative universes. Therefore, a future contingent claim is neither true nor false *simpliciter* and bivalence fails, although relative to one or another branch future contingents will also have a determinate truth-value.<sup>17</sup> According to the second way, the branching model is thought of as the structure of the canonical block universe; the B-theorist can adequately vindicate the claim that one of the branches is the thin red line. If the framework is B-theoretic, and tenseless facts are the most basic ones, there is no objective fact of the matter about which instant is present *simpliciter*. The notion of being present is understood in merely indexical terms, and each instant is present when considered with respect to itself, and past or future if considered with respect to instants that come before or after it in the fundamental B-series. Therefore, we are allowed to take a “God’s eye” view when providing truth-conditions for future contingents, and attribute a determinate truth-value to each future contingent claim depending on how things will actually be. The idea of a thin red line is thus a viable option within a B-theoretic eternalist framework.<sup>18</sup>

<sup>17</sup> See Saunders and Wallace (2008) and Wallace (ms.)

<sup>18</sup> This point is discussed in detail in Borghini and Torrenco (2012), where it is

Moreover, as seen in section 1.1, standard presentism cannot resort to future facts *in the strong sense* in order to provide a proper ground for future contingent truths. As I have put it, the distinction between weak and strong facts is defined only for tensed facts, and hence, *at the fundamental level*, it makes no sense for the B-theorist. But if she is willing to accept tensed facts at a non-fundamental level, she will have – relative to times and histories – future facts both in the weak and in the strong sense. Imagine the fact that *Alan is sitting at  $t$*  and the fact that *Alan is standing at  $t'$*  constitute reality on a given history  $h$ , and that  $t'$  is future with respect to  $t$ . At the non-fundamental level of tensed facts, on  $h$  the B-theorist will have both the future fact that at  $t$  *Alan will be standing* and the future fact that at  $t'$  *Alan is standing*. Within such a framework, the eternalist can hold that, for every time  $t$  considered as present, there are many weak future facts, relative to each nomologically possible history. However, relative to  $t$ , from a “God’s eye” view only one

also stressed that the same rationale would *not* hold in an A-theoretic framework. In an A-theoretic framework, there *is* a fact of the matter as to what time is the present. Hence, introducing a thin red line in the present moment would require the introduction of further brute facts about which future branch will be (as of now) the actual one. See also Øhrstrøm (2009).

of those histories is the actual future; contrary to the standard presentist, the eternalist has the resources to maintain that the actual future of  $t$  is a succession of *strong* future facts.

The central thesis of this chapter is that, in contrast to the standard version, fragmentalist presentism can be coupled with the idea that there is a thin red line without inflating the ontology with brute facts about the actual future. I will show how to fictionally order the fragments in a tree-like structure that branches towards the future. As I will argue, under the hypothesis that we live in a single universe (and not a multiverse), not all the branches can be taken to be part of reality. Given that reality encompasses a single time line, only the fragments belonging to a certain branch are “out there”; only one branch is properly part of reality. Thus, fragmentalist presentism allows us to develop an *A-theoretic* branching-time model that is fully compatible with the thin red line. Within a framework of this kind, one can finally adopt unrestricted bivalence for future contingents.

## 2.2 Fragmentalism and the Flow of Time

Can fragmentalist presentism secure bivalence for future contingents more easily than standard presentism? An obvious strategy to achieve this is

to order the fragments in a sequence, which could play the role of a temporal succession of instants ordered by an earlier-later relation. Through such a “pseudo-B-relation”  $<_{ps}$ , the fragmentalist can provide bivalent truth-conditions for future contingents in the familiar way. Imagine that two fragments  $F_1$  and  $F_2$  are such that within  $F_1$  all facts that obtain at a certain instant  $t_1$  obtain, and within  $F_2$  all facts that obtain at a certain instant  $t_2$  obtain. We can stipulate that  $F_1 <_{ps} F_2$  if and only if  $t_1 < t_2$ . Then, a future claim ‘in the future,  $\varphi$ ’ is true in  $F_1$  if and only if there is a fragment  $F_2$  such that  $F_1 <_{ps} F_2$ , and within  $F_2$  the fact that  $\varphi$  obtains. By ordering the fragments we can put them to use as instants in a standard semantics for tenses. I maintain that this idea is roughly on the right track, even though there are at least three problems that it must face.

Firstly, properly speaking  $<_{ps}$  is not a *temporal* sequence, since it holds between fragments and not between instants. Fragments are nothing but collections of presently obtaining facts, and therefore no fragment comes before or after another. Even worse, there are literally no facts “connecting” them, since facts obtain only within fragments, and there is no “uber-fragment” encompassing them all within which facts concerning  $<_{ps}$  can obtain. If so, one may wonder how such a view would vindicate –

as tense realism in general aspires to do – the reality of the flow of time.

Secondly, and relatedly, the fragmentalist seems to accept explicit quantification over fragments; as I have just said, ‘in the future,  $\varphi$ ’ is true in  $F_1$  if and only if *there is* a fragment  $F_2$  such that  $F_1 <_{ps} F_2$ , and within  $F_2$  the fact that  $\varphi$  obtains. But if fragments can be quantified over, and they can play the role that instants play in standard eternalist B-theory, where exactly is the distinction between the two positions? The whole picture of a *presentist* metaphysics starts to fade.<sup>19</sup>

Thirdly, even if the two former difficulties can be overcome, bivalence for future contingents would be secured *only if*  $<_{ps}$  is linear, that is if the order of fragments is total. But why should that be so? After all – as seen in the previous chapter – within each fragment the only future facts we find are future facts in the weak sense, i.e., presently obtaining future-tensed facts. Those future facts can be about a *branching* temporal topology, rather than a linear one. Indeed, this is what we should expect by expanding to the non-standard case the picture discussed at the beginning. But if this is the story within each fragment, then it seems that the relation  $<_{ps}$  that holds between fragments should be equally

<sup>19</sup> Tallant (2013) raises a similar complaint for non-standard forms of presentism in general.

branching towards one of its sides. If so, resorting to it clearly cannot solve the problem of bivalence. What to do, then? In this section and in the next one, I deal with the first two difficulties, while in section 2.4 I will deal with the third one.

Whilst the second problem points at how to distinguish fragmentalist presentism from the “block view”, i.e. standard B-theoretic eternalism, the first one can be seen as a challenge to distinguish it from “the spotlight view”, i.e. A-theoretic eternalism, in particular from its “super-time” version.

As Brad Skow argues in a series of related articles on the spotlight view,<sup>20</sup> we can articulate the idea that the present (or the NOW, in his terminology) moves from one instant to the next one in the temporal series, by resorting to a further dimension – *viz.* super-time – in which this movement takes place. Points in super-time are ordered by a relation that “mimics” the linear topology and metric of B-series of instants. Thus, from the perspective of a point of super-time  $T_n$ , an instant  $t_n$  is present, and all those coming before it (all  $t_x$  such that  $t_x < t_n$ ) are past, and all those coming after it (all  $t_x$  such that  $t_n < t_x$ ) are future. This allows us to provide an account of the flow of time as the movement of the NOW

<sup>20</sup> See in particular Skow (2009, 2012).

through the temporal series:

So with supertime we can make sense of the NOW's motion: for the NOW to move is to be located at different times relative to different points of supertime. (Skow 2012: 224)

It should be quite clear that the super-time construal of the spotlight view and non-standard tense realism bear similarities. Points of super-time closely resemble fragments (or perspectives). As with fragmentalism, facts obtain within fragments (and as with external relativism, reality is constituted by tensed facts relatively to perspectives), in the super-time story *from the perspective of* different points of super-time, different instants are past/present/future, and hence (we can assume) certain tensed facts rather than others obtain. Yet, there is a crucial difference between the two views.

This difference has two aspects: Skow's super-time is a *metaphor*<sup>21</sup> to explain the *standard* form of eternalist tense realism. Fragments and perspectives are not meant to be metaphors, but to be fundamental in-

<sup>21</sup> Skow's super-time is not "hyper-time", *viz.* a second dimension of time, as the one sometimes discussed in the framework of time travel scenarios (see Meiland 1974 and van Inwagen 2009a). Rather, it bears similarity to Schleisinger (1991)'s modal notion of "meta-time".



gradients of a metaphysical picture. But what is super-time a metaphor of? The spotlighter has to be careful not to collapse the series of super-time points with the actual B-series of instants, on pain of collapsing her position into a form of B-theory in disguise. Thus, it cannot be a metaphor of tenseless facts concerning which instants are past, present or future relative to each other. But she must also be careful not to duplicate time in her picture, by introducing a *further* actual temporal series, in which the NOW can “flow”. The “third way” is to construe super-time as a metaphor of irreducible tensed facts, expressed by primitive tense operators.

Talk of the NOW’s motion is to be understood using primitive tense operators [...]. “The NOW is moving into the future” means (roughly) “The NOW is located at  $t$ , and *it will be the case that* the NOW is located at a time later than  $t$ .” (Skow 2012: 224)

That is why the metaphor is about a standard form of tense realism. This is a crucial aspect of the view: in the standard picture, one time is present *simpliciter*, and not relative to perspectives or fragments. The movement of the NOW along the super-time series is thus a metaphor for the changes in which facts are absolutely present. As Pooley rightly notes in discussing Skow’s view, the problem is that there are still two

times in this picture: there is the A-theoretic super-time, understood in primitively tensed terms, and there is the B-theoretic time of the temporal series on which the spotlight shines and moves.<sup>22</sup>

However, fragmentalist presentism is different and it has to stand no such charge. As a *non-standard* form of tense realism, it accepts *Neutrality*. Within each fragment, only one instant  $t$  is present, and all past-, present-, and future-tensed facts obtain at present. But all fragments are on a par, and no one corresponds to what time is present *simpliciter*. Hence, within each fragment time is *A-theoretic*: fragments are constituted by irreducible tensed facts, and the flow of time is a feature of reality within each fragment. In the fragmentalist picture there is no movement of the absolute NOW along the series of fragments, and hence there is no super-time. Yet, if I am right, there is a pseudo-B-series. Thus, it seems that the fragmentalist has a two-time problem, all in all. It is that while in the spotlight view super-time is A-theoretic and normal time is B-theoretic, in the fragmentalist picture “super-time” (i.e. the pseudo-B-series of fragments) is B-theoretic, while ordinary time (i.e.

<sup>22</sup> Already Williams (1951) points out a similar problem for the view that he attributes to McTaggart. Pooley (2013) dislikes the duplication of time because of the epistemic problems it gives rise to (see Braddon-Mitchell 2004).

time within each fragment) is A-theoretic.

But this distinction makes all the difference, because the fragmentalist – unlike the super-time spotlihter – *can* avoid the two-time objection by taking the ordering of fragments by  $<_{ps}$  to be a fiction. Indeed, that is precisely how I propose to solve the first predicament:  $<_{ps}$  is not a temporal series, but a fiction – a fiction that does not lead to a two-time problem because, in contrast to super time, it does not encode an A-theoretic dimension build on top of a B-theoretic block universe. But how are we to recover the ordering of  $<_{ps}$ , if reality is fragmented? It seems that we are never in a position to recover at once all the elements that we need to construct such series; there is no uber-fragment in which facts concerning  $<_{ps}$  can obtain. Pooley notices an analogous problem with respect to the external relativist account of the passage of time in terms of variation through different temporal perspectives:

Does this variation with temporal perspective provide us with a sense in which the non-standard view vindicates the passage of time? There is an apparent problem with the suggestion that it does. The variation is not itself a fact about how reality is. Our model of the view includes such variation but [...] features of the model that transcend what is true from each temporal perspective do not correspond to perspective-independent facts about reality.

There are meant to be no such facts. (Pooley 2013: 336)

This is correct also for fragmentalism: the pseudo-B-series is not grounded in facts connecting the different fragments, and cannot be, since there are no such facts. But this is how it should be. The story about  $<_{ps}$  is a fiction that is not grounded in such alleged facts. Nonetheless, the fiction is justified by the very metaphysical hypotheses about temporal reality that constitute the core of fragmentalist presentism. By facing the second problem (how to differentiate fragmentalism-cum- $<_{ps}$  from B-theoretic eternalism) and the third one (how to recover bivalence if  $<_{ps}$  is a tree-like order), I will also clarify how the fiction is to be conceived.

### **2.3 Overlap and Branching Ordering**

As said above, the dangerous proximity between the position I advance and standard B-theory is given by the fact that I proposed to provide bivalent truth-conditions for future contingents by quantifying over fragments ordered by  $<_{ps}$ . It should be clear from what I said at the end of the previous section that this quantification is to be understood as part of the fiction. But what is the reality behind this fiction? A hint comes from Fine (2005: 281) himself, when he spells out the account

of the flow of time in the fragmentalist picture: “Any fact is plausibly taken to belong to a ‘fragment’ or maximally coherent collection of facts; and so reality will divide up into a number of different but *possibly overlapping* fragments” (italics mine). Roughly speaking, two fragments are said to be partially overlapping if they share some tensed facts, such as the fact that *there were dinosaurs*. Intuitively, the fragmentalist can hold that, since a tensed fact of this kind is “temporal”, the relation of overlap between these two fragments is sufficient to order them in a temporal succession. Tallant contended that

[t]he trouble with such a proposal, aside from it being extremely controversial, is that these facts are insufficiently refined to act as suitable ground for true propositions about the past (and future) and when they are replaced with facts that *are* suitable, we find that the distinct fragments of reality will no longer overlap. (Tallant 2013: 293, italics in the original)

As an example, Tallant proposes to consider a true proposition like ‘Jonathan was hungry five minutes ago’. Its truth – he underlines – cannot be adequately grounded by the tensed fact that *Jonathan was hungry*, but rather by the more precise tensed fact that *Jonathan was hungry five minutes ago*. To put it another way, the truth of ‘Jonathan

was hungry five minutes ago' cannot supervene on *Jonathan's having been hungry*, but must instead supervene on the more specific *Jonathan's having been hungry five minutes ago*. But it is easy to see that this more specific tensed fact cannot overlap with the fragment that represents

how things will be in another minute's time. For, in another minute, the tensed fact that we will require is not *Jonathan's having been hungry five minutes ago*, but *Jonathan's having been hungry six minutes ago*. (Tallant 2013: 294)

Nothing prevents us – Tallant concludes – from thinking of the fragments as constituted only by more specific tensed facts of this kind. But then it is hard to make sense to the claim that different fragments can overlap. Hence, the fragmentalist cannot explain how to order her fragments in a temporal sequence.

I think that Tallant's reply can be overcome. I am willing to admit that there are many propositions whose truth supervenes on "more specific" tensed facts, such as the fact that *Jonathan was hungry five minutes ago*. Consequently, I admit that we are required to think of fragments as constituted by such metric tensed facts. However, I disagree about whether this is sufficient for claiming that fragments cannot overlap. To be clear about the point of my reply, consider a fragment  $F_n$  containing

the tensed fact that *dinosaurs became extinct at least 65 million years ago*. Given that tensed fact, in  $F_n$  the proposition ‘Dinosaurs became extinct at least 65 million years ago’ is obviously true. Note that if in  $F_n$  this proposition is true, then in  $F_n$  the proposition ‘Dinosaurs became extinct at least 64 million years ago’ is also true, since the former entails the latter. It follows that  $F_n$  must also contain the tensed fact that *dinosaurs became extinct at least 64 million years ago*. Now, nothing prevents the fact that *dinosaurs became extinct at least 64 million years ago* from obtaining in another fragment – call it  $F_m$ . But then  $F_n$  and  $F_m$  share at least one tensed fact, namely the fact that *dinosaurs became extinct at least 64 million years ago*. In other terms,  $F_n$  and  $F_m$  are partially overlapping.

We have no reason to exclude tensed facts like *dinosaurs became extinct at least 65 million years ago* from the inventory of what Tallant calls “more precise” tensed facts. On the contrary, note that the former can be thought of as *supervening* on the latter. After all, if it is true that Jonathan was hungry five minutes ago, *a fortiori* it will be true also that Jonathan was hungry at least five minutes ago.

As I have underlined in the previous chapter, since each fragment contains no more than presently existing things, every past or future fact

that we find in a given fragment is a past or future fact in the weak sense: a presently obtaining past- or future-tensed fact. The same goes for the “at least” tensed facts such as the ones I have just taken into consideration: they are non-present weak facts and then the presentist can accept them. The pseudo-B-series of fragment can then be reconstructed out of the overlap of “at least” facts among fragments. Of course, I am spelling out a fiction here: properly speaking, there are no facts about the overlap of fragments, because those would obtain only within an incoherent “uber-fragment”. And yet this model encompasses overlapping fragments. This is what the very hypotheses that fragments are constituted by “at least” facts, among other facts, let us conclude. Even more interestingly for the present purposes, an order can also be reconstructed in the case within each fragment the tensed facts are about a branching temporal succession and the relation  $<_{ps}$  is branching towards one of its sides. But how exactly is the relation of overlap sufficient for ordering the fragments along such a branching succession? Let us turn to a slightly more regimented framework.

I introduce the sentential operator  $ATLEAST_n$ , to be read informally as ‘at least  $n$  million years ago’.<sup>23</sup> Given a present-tensed propo-

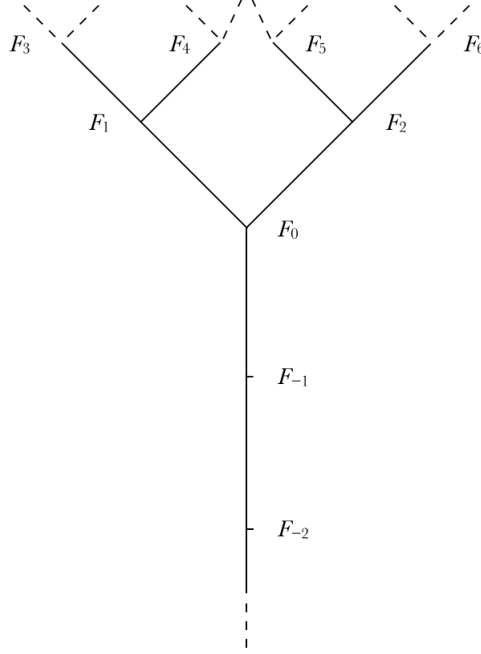
<sup>23</sup> Or any other unit of time, such as days or seconds. Here I am taking into



sition such as ‘Dinosaurs become extinct’,  $ATLEAST_n$ (dinosaurs become extinct) is to be read as the past-tensed proposition ‘Dinosaurs became extinct at least  $n$  million years ago’. Now, consider for example a fragment,  $F_0$ , containing the tensed fact that *dinosaurs became extinct at least 65 million years ago*, that is, a fragment in which  $ATLEAST_{65}$ (dinosaurs become extinct) is true. Furthermore, while  $F_0$  contains the tensed facts that *dinosaurs became extinct at least 64 million years ago*, that *dinosaurs became extinct at least 63 million years ago*, and so on and so forth, it does not contain the tensed fact that *dinosaurs became extinct at least 66 million years ago*. Now, we can order the fragments to be placed in the trunk whose upper bound is  $F_0$  (see Fig. 1) by analysing how they overlap with  $F_0$ .

More precisely, given a fragment  $F_n$ , it will be part of the trunk if and only if it does not contain the tensed fact that *dinosaurs became extinct at least 65 million years ago*. Conversely, it will be located in one of the branches if and only if it contains the tensed fact that *dinosaurs became extinct at least 65 million years ago*. Analysing the overlap relation also allows us to determine *the order* in which the fragments are disposed

account the discrete case; the case of a dense time requires further complications that fall beyond the scope of this thesis.


 Fig. 1. A branching succession of fragments with respect to  $F_0$ 

along the trunk. Take for example two fragments  $F_{-1}$  and  $F_{-2}$ . Suppose that  $F_{-2}$  contains the tensed fact that *dinosaurs became extinct at least 63 million years ago*, while  $F_{-1}$  also contains the tensed fact that *dinosaurs became extinct at least 64 million years ago*. In other words, there is at least one tensed fact obtaining in  $F_0$  that also obtains in  $F_{-1}$ , but not in  $F_{-2}$ . In this case,  $F_{-1}$  will be closer to the upper bound than  $F_{-2}$  (in more formal terms, it holds that  $F_{-2} <_{ps} F_{-1}$ ). To synthesise in a motto: the larger the overlap, the smaller the distance to the upper bound. This would suffice to order completely the fragment in the case of linear time (i.e., if, within each fragment, time is linear). But if the

future-tensed facts within each fragment are about a branching structure, as I am assuming, we need some further refinement.

In order to calculate the distance (from the upper bound of the trunk) of the fragments that are disposed along the branches we can adopt the previous strategy, but calculating their distance to the upper bound of the trunk may no longer be sufficient for pinpointing their location. Consider Figure 1.<sup>24</sup> Assume that both  $F_1$  and  $F_2$  contain the tensed fact that *dinosaurs became extinct at least 66 million years ago*, and that they do not contain the tensed fact that *dinosaurs became extinct at least 67 million years ago*. It follows that they are at the same distance to  $F_0$ . This is sufficient for determining their position (in this case, the motto will be: the smaller the overlap, the larger the distance to the upper bound), but only because they are directly connected to the upper bound  $F_0$ . But what about the higher branches? Consider  $F_3$  and  $F_5$ . Even though we are told that they are disposed to the same distance to  $F_0$  (assume both that they contain the tensed fact that *dinosaurs became extinct at least 67 million years ago* and that they do not contain

<sup>24</sup> To keep things simple, I assume that  $F_1$  and  $F_2$  are the only “future” fragments directly connected to  $F_0$ . Analogously, I assume that in the “future” of both  $F_1$  and  $F_2$  there are no more than two directly connected fragments.

the tensed fact that *dinosaurs became extinct at least 68 million years ago*), we cannot determine either whether  $F_3$  is connected to  $F_1$  or to  $F_2$  or whether  $F_5$  is connected to  $F_1$  or to  $F_2$ . To this end, we need a slightly more refined method. My proposal is the following. Since – *ex hypothesi* –  $F_1$  and  $F_2$  are two distinct fragments, there is at least one proposition – call it  $p$  – such that if  $p$  is true in the former, then  $p$  is false in the latter, and vice versa. Suppose that  $p$  is the proposition ‘Human beings become extinct’ and that it is true in  $F_1$ . It follows that in every fragment connected to  $F_1$  it will be true that  $ATLEAST_{-1}(p)$ , while in every fragment connected to  $F_2$  this proposition will be false. Hence,  $F_3$  will be connected to  $F_1$  if and only if it contains the tensed fact that *human beings became extinct at least 1 million years ago*, while  $F_5$  will be connected to  $F_1$  if and only if it does not contain this fact. This gives us the ordering of the fragments in a branching structure.

The fiction of the branching pseudo-B-relation gives us what we need to order the fragments in a way that mimics the temporal succession within each fragment, which is the reality behind the fiction. The difference with respect to the B-theory is therefore profound. According to the B-theorist, reality is constituted by all facts that obtain at all times in a coherent whole (since those facts are tenseless). According

to the fragmentalist, there is no such coherent whole, and the order of the fragments is fictionally reconstructed from the information about the overlap between fragments which we can recover from the tensed facts that presently obtain within a given fragment. Unlike the fiction of super-time, such a fiction is B-theoretic rather than A-theoretic, but it does not surreptitiously reintroduce tenseless elements at the fundamental level. The pseudo-B-relation is neither an irreducible tenseless relation nor a non-fundamental relation that can be reduced to tensed facts. There are no facts about  $<_{ps}$  on which the fiction is grounded. The reality behind the fiction is the collection of tensed facts that obtain within one fragment. The hypothesis that reality is as the fragmentalist says – i.e. a fragmented whole of coherent collections of tensed facts – licenses the fiction of a series of partially overlapping fragments which reflects the temporal series that we find within each fragment.

## **2.4 The Invisible Thin Red Line**

As I have just stressed, the pseudo-B-relation mimics the temporal succession within each fragment. Therefore, since I have assumed that within each fragment time has a branching topology, the fiction will be about a branching ordering of fragments. In other words,  $<_{ps}$  is a par-

tial order, such that it is linear towards one of its sides, but non-linear towards the other. If so, such a fiction seems to be useless for providing bivalent truth-conditions for future contingents. Within each fragment time branches, and no presently obtaining future-tensed facts are privileged in any metaphysical sense. As I have pointed out in section 2.1, what we need is a thin red line that signals out the actual course of events among all nomological possible alternatives. That is, we need a way to express – in the fiction – which fragments contain facts that constitute reality. We could, of course, insert a thin red line within each fragment, just as the standard presentist can insert brute facts about which one of the possible future histories will be the actual one. In that way the fiction itself will contain a thin red line. But such a manoeuvre would condemn any account of how to signal out a thin red line in the ordering of fragments to be circular, or at any rate grounded on the very same brute facts that we find within each fragment. As Pooley also notices, the only information we can recover within each fragment is that a single course of events will be the actual future, but not which one it will be.

[W]hile a given branching structure (absent a thin red line) does not encode a single sequence of the kind we have been considering, it does encode that the future tensed facts that hold at later and

later times correspond to some such sequence. (Pooley 2013: 342)

To appreciate the point, remember that I am dealing here not with a multiverse idea of reality, but with a single – albeit fragmented – universe. If the reality of the fragmentalist is a multiverse in which every possible future alternative actualises in some alternative universe, then there is no reason to think that bivalence for future contingents should hold. In such a case, the branching structure of fragments highlighted in the previous section can be taken at face value – so to speak – to provide truth-conditions relativised to histories, while leaving undetermined whether a future contingent is true *simpliciter* within a given fragment. From the point of view of each fragment the different histories to which truth is relativised represent the distinct universes, which are all “out there” in the fragmented reality. Thus, although the branching order of fragments would still be a fiction, every fragment that we postulate in the fiction will correspond to a part of the fragmented reality, since in a multiverse all nomologically possible alternatives will be realised.

Consider a very simple situation in which we ask whether in one unit of time it will be the case that  $p$  within a fragment  $F_0$ .<sup>25</sup>

<sup>25</sup> I will employ the metric tense operator  $\text{WILL}_n\varphi$  to express that it will be the case that  $\varphi$  in  $n$  units of time. The non-metric tense operator  $\text{WILL}\varphi$  is defined in

$$[\text{WILL}_1 p]^{F_0} = ?$$

Assuming that  $p$  is contingent, there will be two (simplifying things) future histories  $h_1$  and  $h_2$  such that according to  $h_1$  it will be the case that  $p$ , and according to  $h_2$  it will be the case that  $\neg p$ . Following the procedure described above (by resorting to the “at least” facts we find in  $F_0$ ), we can construct a fiction in which two fragments  $F_1$  and  $F_2$  are both at a distance of one unit from  $F_0$  and are such that within  $F_1$  it is the case that  $p$  and within  $F_2$  it is the case that  $\neg p$ .

$$[p]^{F_1}$$

$$[\neg p]^{F_2}$$

In the fiction, history  $h_1$  “passes through”  $F_1$  and history  $h_2$  “passes through”  $F_2$  (see Fig. 2). Hence, while it is not settled whether within  $F_0$  it will be the case that  $p$  in one unit time, the fiction of  $<_{ps}$  allows us to state that within  $F_0$  relatively to history  $h_1$  it will be the case in one unit of time that  $p$ , while relatively to history  $h_2$  it will not:

$$[\text{WILL}_1 p]^{F_0} = \text{Ind}$$

$$[\text{WILL}_1 p]^{F_0, h_1} = \text{T}$$

$$[\text{WILL}_1 p]^{F_0, h_2} = \text{F}$$

the usual way as: for some  $n$ , it is true that  $\text{WILL}_n \varphi$ . See Prior (1968).



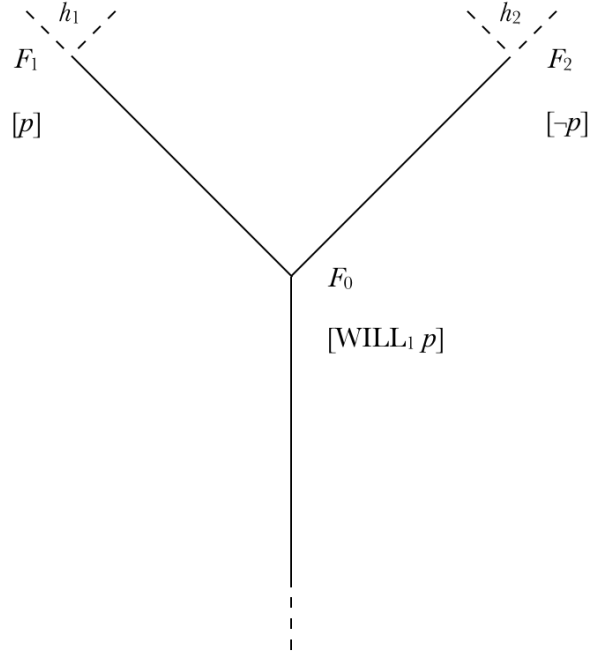


Fig. 2.  $h_1$  “passes through”  $F_1$ , while  $h_2$  “passes through”  $F_2$

Notice that although histories are not fictional, since they are constituted of future facts in the weak sense that obtains within  $F_0$ , the trunk and the branches constituted by succession of fragments are fictional, since within each fragment presently obtaining facts are the only facts that obtain, and in fragments such as  $F_1$  and  $F_2$  we find facts that do not obtain at present (from the point of view of  $F_0$ ). Yet, on the assumption that we live in a multiverse, we are justifying in taking the fiction as corresponding to two distinct, but both actually existing, parts of reality. After all, both histories will be actual, although in two different universes.

The situation is different if we live in one single universe with a single

time line, and branching towards the future is just what reality is like from the point of view of each fragment. In such a case, as we have seen, the fiction that we can construct about the ordering of fragments will contain the information that *not all fragments* that constitute the different branches are part of reality. In other words, we know that in the fiction we are postulating *more* fragments than there actually are. We can still relativise truth to nomologically possible histories, if we like, but on the assumption that the fragmented reality is unique and encompasses one single time line, we are not authorised to take all fictional branches of fragments as part of reality. Although within each fragment all *histories* are not fictional and equally on a par, we know that only one of the *branches* is “out there” in the fragmented reality (see Fig. 3).

What, then, are the options for the fragmentalist who does not endorse a multiverse view of reality? One is to exploit the fiction to provide supervenient truth-conditions for future contingents. That would save the law of excluded middle, but still jettison bivalence. Pooley (2013: 343) seems to favour such an option, on the grounds that there is neither a “global” point of view, nor an “end of time” perspective (“the end of time is never reached”) from which we can reconstruct the information about the whole of reality. In his words:

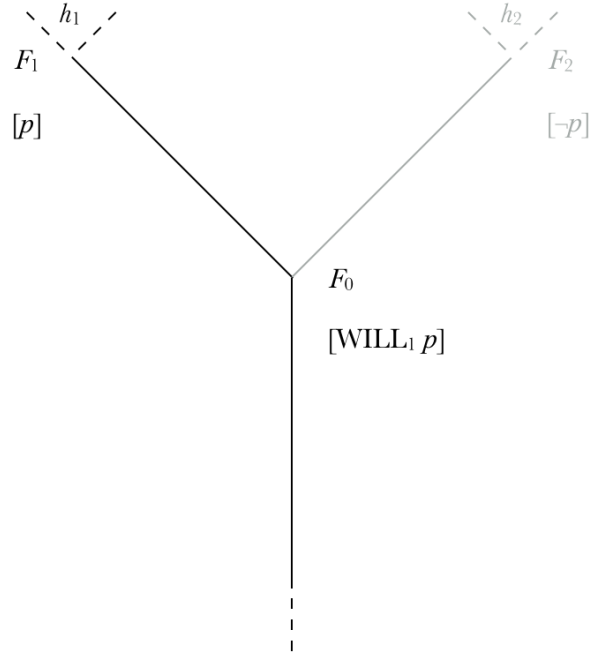


Fig. 3.  $F_1$  lies on the thin red line

Just as the tensed facts that hold as of some time are not reducible to tenseless facts, there is no need for them to be deducible from the tensed facts that hold as of other times. As of  $t$ , it is neither true nor false that there will be a sea battle at  $t'$ . As of  $t'$ , it is true that a sea battle is raging. [...] [I]t might seem that this open-future version of non-standard *A* Theory better captures the passage of time than a version in which the tensed facts as of one time can be read off from those that hold at another. In the latter case, it is hard to see what the insistence that such facts are not reducible comes to, for there is a unique representation of reality – the block

universe – from which the perspectival facts can be derived. This is no longer true of the open-future model. The primordial branching structure captures only how things might turn out, not how they will turn out. (Pooley 2013: 342-343)

As I have already stressed in differentiating fragmentalism from standard B-theory, I agree that, given the irreducible tensed nature of the facts that obtain within each fragment, information about “future” perspectives cannot be recovered from “earlier” ones (scare quotes are due, since I am talking about the ordering of the fragment in the fiction of  $<_{ps}$ ). And yet there is something puzzling in the idea that the fragmentalist picture “captures only how things might turn out, not how they will turn out”. Although we are barred from recovering information about the future, in the fragmentalist picture reality is *not* constituted by all facts that, in the fiction, obtain within each fragment (unless we live in a multiverse). Therefore, the very hypothesis that reality is fragmented (and we do not live in a multiverse) elicits the idea that in the fiction one of the branches *must* be singled out as the thin red line, i.e., the one corresponding to the actual course of future events. Of course, such a thin red line is epistemically inaccessible from within a single fragment, since within each fragment the future is not real, and we have access only

to facts that obtain in the fragment we find ourselves in. If we introduce such a thin red line in the fragmentalist fiction of a pseudo-B-series of fragments, then, it would be *invisible* at an epistemic level. Indeed, it would be invisible even at a *metaphysical* level as well. Thus, our fragmentalist has the tools to formulate bivalent truth-conditions for future contingents as follows (I employ  $\in_{ps}$  ITRL to express the pseudo-relation between fragments belonging to the invisible thin red line):<sup>26</sup>

$$[\text{WILL}\varphi]^{F_m} = \text{T if and only if there is a fragment } F_n \in_{ps} \text{ ITRL} \\ \text{such that } F_m <_{ps} F_n, \text{ and } [\varphi]^{F_n} = \text{T}$$

I agree with Pooley that we do not find facts about a thin red line either in an “uber-fragment” in which all facts that constitute reality obtain (there is no such incoherent thing), or in a fragment corresponding to the end of time (“the end of time is never reached”). But in order to postulate

<sup>26</sup> To repeat, here we are dealing with tensed facts constituting reality in an absolute manner. The fact that we are required to evaluate  $\text{WILL}\varphi$  with respect to a specific fragment  $F_m$  does not conflict with the claim that to the fragmentalist presentist bivalence holds *unrestrictedly*; no more than the fact that we are bound to evaluate the sentence – to say – ‘Alan is sitting’ relative to a given instant conflicts with the claim that its truth supervenes on a tensed fact – the fact that *Alan is sitting* – constituting reality in an absolute sense.

a thin red line across the ordering of  $<_{ps}$  we do not need further facts that can ground it. As with the construction of the tree of fragments, what we need is a *justification* to introduce such a fiction. And it is the metaphysical hypothesis that reality is made of incoherent fragments in which incompatible tensed facts obtain, together with the possibility of cooking up a story about their ordering, that justifies (barring a multiverse) the introduction of an invisible thin red line in the fiction. Since within each fragment the future branches, but *ex hypothesi* there is *one* fragmented reality with *one* temporal dimension, it would be unfaithful to the metaphysics presented here *not* to postulate it in the fiction.

That is why, as distinct from standard presentism, adding a thin red line is no extra cost for the fragmentalist. In the standard picture, having a thin red line entails accepting brute facts about what the actual future will be within the perspective of the present time, which is the only real perspective. But in the fragmentalist version of the story, we are not required to accept facts about the actual future within each fragment. If fragmentalism is true, we know that an invisible thin red line can't fail to be out there, since only the fragments that form a certain sequence in the fiction are part of reality; all others are not part of reality at all. At one point, Pooley seems to be sympathetic to such an idea:

The model of the non-standard variant of the view *does* involve a particular sequence [a sequence of perspectives that stands for the actual future course of events]. Each element of it represents the irreducibly tensed facts that hold as of some time. This might seem to give us a more explicit representation of once open possibilities being settled by the passage of time: what is indeterminate as of  $t$  is settled in such-and-such a way as of  $t'$ . But care is needed: the sequence of trees does not represent how reality is absolutely, as conceived from no particular temporal point of view. (Pooley 2013: 342, *italics in the original*)

As we have seen, “care” pushes Pooley to reject the idea that the fact that “the view *does* involve a particular sequence” justifies the endorsement of a thin red line. That may be because Pooley uses a different version of non-standard tense realism (external relativism). Remember that while both external relativism and fragmentalism accept Neutrality, external relativism rejects Absolutism while fragmentalism rejects Coherence, as I repeat below:

*Absolutism*    The constitution of reality is an absolute matter, i.e. not relative to a time or other form of temporal standpoint.

*Coherence*    Reality is not contradictory; it is not constituted by facts with

incompatible content.

Thus, the fragmentalist does not accept that constitution of *reality* is irreducible relative to fragments (or perspectives, or points in super-time, or what have you); although she does relativise what facts obtain to fragments: we are never allowed to claim that facts that we find in a fragment different from the one in which certain facts obtain also obtain. The fragmentalist reality is not “of a piece” because as a whole it would be incoherent, but it is nonetheless constituted by all tensed facts in a *absolute* sense. On the other hand, in the external relativist picture, tensed facts do not constitute one reality, since they only constitute reality *relative* to perspectives. This makes a difference when it comes to the fiction of ordering the fragment with  $<_{ps}$ . In an external relativist framework, it is not only that we do not find a global perspective or a perspective as of the end of time, we do not find a reality constituted by all the facts that we find along the thin red line, indeed along any of the fictional fragments. Hence, in an external relativist framework the postulation of a thin red line would be a fiction about a further reality constituted by incompatible facts. This may be a price that someone endorsing such a version of non-standard tense realism – as Pooley in the paper we just quoted – may not be willing to accept. But in the



fragmentalist version, since Coherence but not Absolutism is dropped, the postulation of such a reality is no additional cost at all; indeed, an incoherent but fragmented whole of incompatible tensed facts is the *only* reality that the model posits. And although the metaphysical hypotheses concerning such a reality entail that neither the branching order of the fragments nor the branch that corresponds to the actual future can even in principle be “seen” (since no facts that ground them obtain), those very hypotheses entitle us to construct a fiction about a sequence of fragments and an invisible thin red line.

## 3

# Fragmentalist Presentism and Four-dimensionalism

### 3.1 Presentism and Four-dimensionalism

Four-dimensionalism – as it will be understood in this chapter – is the view that reality contains instantaneous spatio-temporal parts, usually called “stages”. Many four-dimensionalists identify the concrete particulars, such as tables and persons, with mereological sums of stages from different times. Concrete particulars would *perdure*, that is, they would persist by having different stages (Lewis 1986: 202). Four-dimensionalism is usually taken to be incompatible with presentism (Heller 1992). The reason is that if there were no time except the present then nothing could have more than one stage, the present one; but then nothing could be a sum of stages from different times.

Notoriously, the first serious attempt to overcome such difficulty was

undertaken by Brogaard (2000), who offered a temporal ontology – called presentist four-dimensionalism – according to which concrete particulars have

four dimensions in the sense that they have an unfolding temporal dimension in addition to the three spatial ones [...] No stage is wholly present at more than one time; every stage is wholly present at exactly one time. There is a new stage for every moment at which a given thing exists. (Brogaard 2000: 343)

And her reply to the claim that no object can genuinely perdure unless it has more than one temporal part is the following:

This objection [...] rests on the idea that objects must have their temporal parts in the same way that they have their spatial parts. That is, temporal parts, like spatial parts, must exist in their entirety. This does indeed hold of those smallest temporal parts which are our successive stages. But it does not hold of temporal parts in general. That this need not be a problem is seen in the fact that events are commonly understood as having temporally extended parts even though these never exist as a whole but only through their successive stages. Similarly, objects, such as you and me, may have extended temporal parts even though these are parts which

exist always only in the sense that they unfold themselves, incrementally, through their successive stages. (Brogaard 2000: 346)

I will not discuss Brogaard's reply here. Rather, I aim to show that fragmentalist presentism provides us with the tools to combine a presentist metaphysics with four-dimensionalism, without rejecting the tenet that "temporal parts, like spatial parts, must exist in their entirety". In what follows, I will take fragments to contain the stages that four-dimensionalists usually describe as spread throughout spacetime regions. The obvious reply to this move is that, according to standard four-dimensionalism, nothing prevents an object from being a mereological sum of stages belonging to *different* times. But how can our fragmentalist presentist describe such a kind of entity if she maintains that, looking from the inside of every fragment, only presently obtaining facts obtain? After all, in section 1.2 I have characterised fragmentalist presentism as the claim that, looking from (what Fine calls) the current perspective, neither the past nor the future is real. The attempt to embrace a perdurantist theory of persistence within such a metaphysical framework seems hopeless. I completely agree. As far as we assume a standard version of perdurantism, this reply cannot be bypassed. Still, the fragmentalist has enough room for manoeuvre in defence of a *non-standard* version of

perdurantism. Let us see how to develop it.

### 3.2 Fragmentalist Presentist Four-dimensionalism

First of all, we need to describe a temporal succession of instants containing the different stages. What we need, in other words, is a sequence of fragments ordered by an earlier-later relation. To this end, I will exploit the pseudo-B-series described in sections 2.2 and 2.3. Now we can see in what sense fragmentalist presentism is compatible with the existence of perdurant objects, as far as it takes fragments to contain tensed facts about stages. Even though, from the current perspective, no more than one stage of a given object  $o$  is real, the fragmentalist ontology exploits the resources of the fictional order of fragments (the pseudo-B-series) to describe  $o$  as spread out over time. Consider the case in which Alan is now running and then sitting and think of Alan as the sum of the stages  $A_1, \dots, A_n$ . Whilst  $A_1$  has the property of being running,  $A_n$  satisfies the property of being sitting. Our presentist will resort to two fragments,  $F_1$  and  $F_n$ , such that  $F_1 <_{ps} F_n$ .  $F_1$  and  $F_n$  will contain, respectively, all the presently obtaining facts about  $A_1$  and  $A_n$ . Both the present-tensed fact that  $A_1$  *is running* and the present-tensed fact that  $A_n$  *is sitting* constitute reality in an absolute sense. While the former obtains

in the fragment  $F_1$ , the latter obtains in  $F_n$ . Remember that, in light of fragmentalism, reality is not confined to one fragment. Rather, is it constituted by all the facts that obtain within each fragment. As I have underlined in the first chapter, Absolutism does not contradict the assumption that, in a sense, only the present is real: there is no fragment in which both the fact that  $A_1$  *is running* and the fact that  $A_n$  *is sitting* obtain, so that within  $F_1$  the strong future fact that  $A_n$  *is sitting* cannot obtain. Similarly, within  $F_n$  the strong past fact that  $A_1$  *is running* does not obtain.  $F_1$  will contain only the weak future fact that  $A_n$  *will be sitting* (a presently obtaining fact); analogously,  $F_n$  will contain only the weak past fact that  $A_1$  *was running*.

It should be clear from what I have said so far that, even though *from the general perspective* every stage of Alan can be said real (since every stage belongs to a fragment), the relation of mereological sum involving the stages is part of the fiction. Properly speaking, no fact about the mereological sum of stages can be grounded (reality is not of a whole). Fragmentalist presentism requires us to think of concrete particulars as fictional “worms” composed by real stages (belonging to different fragments); to synthesise in a motto: the parts are real, the whole is not.

Someone might now find tempting the following objection. Standard

perdurantists claim that – in Sider (2001: 60)’s words – “it is spacetime worms that are [...] the referents of ordinary terms, members of ordinary domains of quantification, subjects of ordinary predications, and so on”. According to this view, an utterance of ‘Alan will be sitting’ is true if and only if the mereological sum of  $A_1, \dots, A_n$  is composed by a future stage that is standing. But, in the light of fragmentalist presentism, reality cannot contain such an object: the sum is fictional. Within each fragment no more than one stage of Alan is real. So, how can fragmentalist presentism account for the truth of the utterance? Adopting the stage view instead of standard perdurantism is no help whatsoever here: similar worries arise. Differently from standard perdurantists, stage theorists claim that the referents of the objects we usually talk about are the single stages, not the worms (Sider 1996, 2000, 2001).<sup>27</sup> Thus, in evaluating the truth of a present-tensed utterance they do not need to appeal to more than one stage (the present one). Still, in evaluating as true or false a past- or future-tensed utterance, they resort to an explicit quantification over stages. As Sider (2000: 84) has it: “[A] current assertion of ‘Clinton was indiscreet’ is true iff the (current) referent of ‘Clinton’ – a stage – has an indiscreet temporal counterpart in the past”. In other words, the

<sup>27</sup> See also Hawley (2001).

truth-conditions for past- and future-tensed utterances they propose require a B-theoretic succession of stages, which – as shown in section 2.3 – is clearly incompatible with the fragmentalist picture. The fragmentalist is never in a position to recover at once all the fragments that she needs to construct a B-series.

This objection can be easily overcome in the following way. Granted: in light of fragmentalist presentism, the truth of a given utterance should be grounded in the facts obtaining within the fragment which the utterance belongs to. Still, as I have argued in section 1.4, nothing prevents our fragmentalist from distinguishing the supervenience base of a given truth from its ground. Suppose that she is willing to say – in accordance with stage theory – that the referent of ‘Alan’ is a single stage of Alan, not the worm as a whole. She will maintain that the truth of an utterance of ‘Alan is running’ both is grounded in and supervenes on the fragment which the utterance belongs to. But what about the truth of an utterance *u* of ‘Alan will be sitting’? She can claim that, even though the fragment which *u* belongs to contains no ground for its truth, still – looking from the general perspective – its truth *supervenes* on the strong future facts involving – in Sider’s terminology – a temporal counterpart of the present stage of Alan (in other words, presently obtaining facts



located in fragments different from the one which the utterance belongs to).<sup>28</sup>

More precisely, the fragmentalist will claim that the truth of the proposition  $u$  expresses in a given fragment modally co-varies with the facts obtaining in the other fragments. If  $u$  expresses a true proposition  $p$  in a fragment  $F_1$ , even though within  $F_1$  we will find nothing but the (presently obtaining) future-tensed fact that  $A_1$  *will be sitting*, there will be another fragment,  $F_n$ , such that it contains the present-tensed fact that  $A_n$  *is sitting*, that is, the fact which  $p$  corresponds to. Conversely, if  $p$  were false we would find neither the future-tensed fact that  $A_1$  *will be sitting* obtaining in  $F_1$  nor the present-tensed fact that  $A_n$  *is sitting* obtaining in  $F_n$ .

What if our fragmentalist embraces the tenet that it is the spacetime worm that is the referent of ‘Alan’, not a single stage? Again, in accounting for the truth of a given utterance, she should carefully distinguish between its ground and its supervenience base. Reconsider the utterance  $u$  of ‘Alan will be sitting’. Within the fragment which  $u$  belongs to no mereological sum of  $A_1, \dots, A_n$  can be grounded. Still, the fragmentalist can refer to the fragments containing all the other stages of Alan as the

<sup>28</sup> Analogously, this strategy can be applied to an utterance of ‘Alan was running’.

supervenience base of the truth of  $u$ . Among these fragments we will find the one containing the future stage that has the property of being sitting.

## 4

# Fragmentalism, Actualism, and Quantified Modal Logic

### 4.1 Actualism and the Simplest Quantified Modal Logic

Actualism – in the way I will use the term in this chapter – is the thesis that everything there is is actual.<sup>29</sup> As Linsky and Zalta (1994) point out, in order to appreciate the actualist tenet we should carefully distinguish between the two parts that comprise it. Firstly, the quantifier ‘there is’ should be understood as existentially loaded. It follows that within an actualist framework there is no reason to think of ‘there is’ as distinct from ‘there exists’. In essence, the actualist picture is anti-

<sup>29</sup> See Linsky and Zalta (1994: 436), Menzel (1990: 355), Adams (1974: 202), Plantinga (1976: 257), Kaplan (1975: 220), and Loux (1979: 48).

Meinongian, basically embracing Quine (1948)'s reading of quantifiers.<sup>30</sup> Thus, actualism can equivalently be formulated as the thesis that everything which exists is actual. Secondly, the claim that there are possible but non-actual objects is false. For this reason, the actualist refuses to quantify over possibilia (Linsky and Zalta 1994: 436).

Many actualists – who I'm going to label as *standard actualists* – reject (at least) the simplest quantified modal logic (QML), which validates the Barcan formula:<sup>31</sup>

$$(BF) \forall x \Box \varphi \rightarrow \Box \forall x \varphi$$

Notoriously, there would be at least two (closely related) reasons for such a rejection. First of all, theorems of the simplest QML would prove to be incompatible with some actualist assumptions (Linsky and Zalta 1994: 436-438; see also Williamson 1998: 258). To appreciate the metaphysical import of BF, consider the logically equivalent schema:  $\Diamond \exists x \varphi \rightarrow \exists x \Diamond \varphi$ . From the premise that it is (metaphysically) possible that I have a daughter, it follows by BF that there is an object that possibly is my daughter.

<sup>30</sup> See also van Inwagen (2009b).

<sup>31</sup> See Barcan (1946). For a detailed exposition of simplest QML, see Linsky and Zalta (1994: 433-435). Throughout this chapter, I will assume no more than a minimal acquaintance with modal logic, setting aside all the unnecessary technicalities.

This is puzzling: I have no daughter, so what is the entity that satisfies the property of possibly being my daughter? “On the plausible assumption that one’s parentage is essential to one” (Williamson 1998: 258),<sup>32</sup> it is clear that no actual object can bear this property. This is evidence – standard actualists conclude – that BF is false (Linsky and Zalta 1994: 436-437, Williamson 1998: 258). Hence, whoever wants to adopt a possible world semantics within an actualist framework should give up the simplest QML in favour of a semantics in which BF is invalid (Linsky and Zalta 1994: 437).<sup>33</sup> Note that the possibilist can easily avoid this metaphysical conundrum. As underlined by Linsky and Zalta, she might drop the assumption that ‘there is’ is existentially loaded, by introducing in her language an existence predicate such that it cannot be defined by using the quantifier ‘there is’. This would allow her to say that by BF all that follows is that there is an object that possibly is my daughter. In

<sup>32</sup> For a defence of origin essentialism see Kripke (1980). See also Salmon (1981) and Forbes (1985).

<sup>33</sup> Deutsch (1990), Fine (1977), Menzel (1990), Plantinga (1974), and Salmon (1987) try to offer a QML compatible with actualism by opting for a modified version of Kripke-style semantics. In this thesis I will not consider these approaches: my aim is simply to analyse the attempts to reconcile actualism with the simplest QML.

contrast to the actualist, nothing compels her to claim that this object also exists (pp. 435, 437).

Further worries arise in analysing the theorem:

$$(NE) \forall x \Box \exists y \ y = x$$

Assuming that the quantifier ‘there is’ is existentially loaded, the formula says that for any object  $x$ ,  $x$  necessarily exists: a striking conclusion, for it seems plausible that there are objects that exist contingently (pp. 437-438). Again, the possibilist seems to be in a better position than the actualist. Taking ‘there is’ to be existentially unloaded, she might read NE as simply saying that, for all  $x$ , necessarily there is  $x$ . There is no reason why she should maintain that  $x$  necessarily exists (pp. 435, 437). Within the possibilist framework, NE proves to be a simple platitude.

What about:

$$(BC) \Box \forall x \varphi \rightarrow \forall x \Box \varphi$$

that is, the converse of BF? Linsky and Zalta (1994: 437) stress that, in the simplest QML, NE is entailed by BC,<sup>34</sup> so that in evaluating the latter the actualist is bound to face – once again – the problems just described in presenting the former.<sup>35</sup> The possibilist – once again – might

<sup>34</sup> See Deutsch (1990).

<sup>35</sup> See also Williamson (1998: 258).

offer a more appealing metaphysical reading of BC, by assuming that objects can bear properties also in worlds in which they do not satisfy the existence predicate. Thus, BC will simply state that, if necessarily every object satisfies a given property, then every object necessarily satisfies that property (pp. 435). In the light of the possibilist reading, ‘every object’ does not refer to everything which exists, but simply to everything there is.

Note that the possibilist has the resources to evaluate BF, NE, and BC as true even if – in accordance with the core idea of actualism – she interprets ‘there is’ as ontologically loaded. Indeed, she might enrich her inventory of the world with *possible* objects, in addition to the actual ones (p. 435). In the light of the resulting view, it follows by BF that there is a possible (non-actual) object bearing the property of being my daughter. In evaluating NE – our possibilist might argue – the actualist confuses the claim that every object necessarily exists with the claim that every object is necessarily actual (p. 436). Thus, the fact that BC entails NE does not raise any concern.

The second reason why standard actualists generally regard the simplest QML as suspicious is that – in accounting for the truth of a given

formula – it requires possible worlds to be included in the model,<sup>36</sup> so committing us to the existence of entities – the possible worlds – which closely resemble possible objects. This is why actualists tend to adopt an abstractionist approach to modal semantics. In other words, they tend to think of possible worlds as nothing but abstract entities (p. 438).<sup>37</sup>

While standard actualists usually reject the simplest QML, attributing to it the unpalatable consequences just described, other philosophers (who I will call *non-standard actualists*) try to reconcile it with actualism. Roughly speaking, the move at the root of non-standard actualism is to enrich the ontology with actually existing entities able to play the same role played by non-actual entities in the possibilist interpretation of modal semantics. Plantinga (1974) reinterprets possibilities as abstract individualities (or uninstantiated haecceities). Unlike the former, the latter are necessary entities; hence they cannot fail to be actual. Linsky and Zalta (1994, 1996) and Williamson (1998, 2000, 2013) argue for a different strategy. They reject the idea that, for any entity  $x$ ,  $x$  is either concrete or abstract. In Linsky and Zalta's words:

<sup>36</sup> For the definition of the model see Linsky and Zalta (1994: 433-434).

<sup>37</sup> In Adams (1974), for instance, possible worlds are defined in terms of maximally coherent sets of propositions.



The abstract/concrete distinction is mistakenly seen as an absolute difference in the nature of objects. Thus, abstract objects are thought to be essentially abstract, and concreteness is thought to be part of the nature of concrete objects, something they couldn't fail to have (whenever they exist). We question these ideas by motivating and introducing what might be called 'contingently nonconcrete objects'. Contingently nonconcrete objects exist and are actual, and they shall replace 'possibilia'. (Linsky and Zalta 1994: 432)

By inflating her ontology with contingently non-concrete entities, the non-standard actualist would have the resources to embrace the truth conditions of modal formulae offered by the simplest QML without appealing to non-actual entities. From a metaphysical point of view, this strategy allows us to think of the truth of BF, NE, and BC as supervening on nothing more than actual entities.

Now, it might seem that the only way of reconciling actualism and the simplest QML is to enrich the actualist ontology with entities that are by some means able to replace possibilia. To put it another way, it is tempting to claim that whoever wants to reject the idea that there exist non-actual objects without dropping the simplest QML is bound to somehow modify the actualist inventory of the world by introducing fur-

ther entities: either abstract individualities or contingently non-concrete objects. In what follows, I argue that this temptation should be resisted. Those who want to preserve the simplest QML have a third viable option between possibilism and non-standard actualism, which I will call *fragmentalist actualism*, a view inspired by the modal analogue of Fine's fragmentalism (section 4.2). In contrast to the non-standard versions of actualism, fragmentalist actualism maintains that reality contains neither abstract individualities nor contingently non-concrete objects. Like possibilism – for reasons that I will analyse in section 4.3 – it allows us to evaluate BF, NE, and BC as true. The claim that there exists such a third view between possibilism and non-standard actualism might seem puzzling. How can the fragmentalist actualist account for the truth of a formula like BF? Doesn't she simply lack the resources to adequately replace possibilia? Without possibilia or their surrogates – it might be replied – evaluating BF, NE, and BC as true seems hopeless! The present chapter is devoted to the solution of this puzzle.

## 4.2 Fragmentalism and Modality

As seen in section 1.2, Fine calls fragmentalism the non-standard version of tense realism that embraces both Absolutism and Neutrality, while

rejecting Coherence.

Now, the realist approach can be extended to the treatment of modality. As Fine (2005: 284-285) underlines, both in the temporal case and in the modal one “we have [...] a certain aspectual feature [...] [– respectively, the tensed nature of facts and their being worldly (or contingent) –] and an associated form of relativity” – the relativity being, respectively, to a time and to a world. Taking the worldly facts to replace the tensed ones, he reinterprets Realism and Neutrality as follows (p. 285):<sup>38</sup>

*Worldly Realism*      Reality is composed of worldly facts.

*Worldly Neutrality*    No possible world is privileged, i.e. the facts that  
compose or constitute reality are not oriented towards  
one possible world as opposed to another.

By exploiting the analogy between times and worlds, I will reinterpret Absolutism as the following thesis:

*Worldly Absolutism*    The constitution of reality is an absolute matter, i.e.  
not relative to a world.

We can now give the modal analogue of the standard tense realism vs. non-standard tense realism debate. In Fine’s words:

The standard realist will claim that there is a privileged world, namely

<sup>38</sup> See also Fine (2006: 400).

the actual world, while the non-standard realist will treat all worlds on an ontological par (but still hold to the reality of worldly facts).

(Fine 2005: 285)

Call *modal fragmentalism* the non-standard realist view that rejects Coherence, while maintaining both Worldly Absolutism and Worldly Neutrality. The metaphysical picture is that the modal dimension is not “of a whole”, but rather fragments into maximally coherent collections of worldly facts – call them modal fragments. Each modal fragment is as concrete as the one we inhabit: all the modal fragments are metaphysically on a par. Modal fragmentalism may *prima facie* recall Lewis (1986)’s concretism. The two theories bear similarities, if only in that they share both Worldly Neutrality and Worldly Absolutism. However, there is (at least) one crucial difference. The concretist thinks of worlds as spread throughout a *unified* modal dimension; thus in providing truth conditions for modal formulae nothing prevents her from genuinely quantifying over them. Even though worlds are taken to be causally disconnected entities, she will claim that their mereological sum exhausts the modal dimension. To the fragmentalist, there is no such sum. The modal dimension is irreducibly fragmented and – so to speak – there is no metaphysical “bridge” binding two or more worlds together: no metaphysical

“conjunction” of facts belonging to different worlds can obtain. Although both the modal fragmentalist and the concretist think of the constitution of reality as an absolute matter (bear in mind Worldly Absolutism), to the concretist facts obtain *simpliciter*, while to the modal fragmentalist they obtain only *within a given world*. Facts that obtain at worlds different from the one we inhabit constitute reality in the same sense as facts that obtain at our world, i.e., absolutely. However, within each world not all such facts obtain. In other words, not all facts that constitute reality obtain in all the modal fragments.<sup>39</sup>

I suggest that the actualist can exploit this idea to adapt the gist

<sup>39</sup> Another crucial difference is that the modal fragmentalist is not bound to adopt Lewis’s counterpart theory. The latter posits that objects are world-bound: their existence is limited to the world of which they are part. World-boundedness is required to maintain – as the concretist does – both Worldly Absolutism and Coherence. Suppose that Alan is a philosopher. Under the reasonable hypothesis that Alan does not essentially have the property of being a philosopher, there is at least one world  $w$  in which a counterpart of Alan is not a philosopher. The concretist resorts to Alan’s counterparts in order to avoid the unwelcome conclusion that Alan – absolutely speaking – both has and does not have the property of being a philosopher. In contrast to the concretist, the modal fragmentalist drops Coherence; thus, nothing prevents her from thinking of  $w$  as containing Alan himself.

of the actualist position to modal fragmentalism, by embracing what we might call *fragmentalist actualism*, that is, the view that within each fragment an actualist ontology holds. In contrast to the concretist, the fragmentalist actualist will claim that, looking from the inside of every modal fragment, there is no non-actual entity “out there”, there is no possible object located in a different modal region, because no trans-world fact about its existence can obtain. Looking from the inside of the modal fragment we inhabit, there is no talking donkey “out there”, even though the worldly facts concerning talking donkeys constitute reality in an absolute manner. In the light of what I have said so far, it should be clear that fragmentalism requires a form of double talk: the absolute talk of constitution and the irreducibly relative talk of obtainment. Remember that one of the ideas at the root of Fine (2005: 297)’s fragmentalism is that “[i]n stating that a fact belongs to reality, we adopt *a general perspective*, but in stating that a fact obtains, we adopt *the current perspective*” (italics mine). In stating that there are no possibilities, our fragmentalist adopts the current perspective – the perspective centred on the modal fragment we inhabit. In stating that the objects located in all the other fragments constitute reality in an absolute manner, instead, she adopts the general perspective – the perspective centred on

the (fragmented) modal dimension.<sup>40</sup> Within the fragmentalist framework, these perspectives both carve at the joints; they both mark two metaphysically fundamental features: the absolute constitution of reality and the limited obtainment of worldly facts.

Fragmentalist actualism is a genuine version of actualism, albeit a peculiar one. It is crucial to stress that the assumption that the modal fragments constitute reality in an absolute manner does not conflict with the idea that, *from the current perspective*, everything there is is actual. In section 4.1 I pointed out that, generally speaking, actualism can be regarded as composed by the two following theses: (i) the quantifier ‘there is’ is existentially loaded and (ii) no non-actual objects exist. In the same spirit, the fragmentalist actualist maintains that, when the perspective is centred on the modal fragment we inhabit, the thesis that everything there is is actual should be understood as the claim that everything which exists is actual. Given a modal fragment  $w$ , although – from the general perspective – the objects belonging to all the other modal fragments constitute reality in an absolute sense, they simply do not exist in  $w$ ,

<sup>40</sup> For the distinction between the perspective centred on a world and the perspective centred on the modal dimension, see what Solomyak (2013: 33-40) calls *pluralist view* of the structure of reality.

since facts about their existence cannot obtain. It follows that, from the current perspective, it does not make sense to claim that there are non-actual objects: if an object is not actual, then it does not exist. The ontology to which the fragmentalist actualist is committed depends on the facts about existence that she is willing to accept, i.e., that she accepts as obtaining; as I repeat, while to the concretist obtainment is absolute, to the fragmentalist actualist obtainment is always limited to a given world.

### 4.3 Fragmentalist Actualism and the Simplest QML

As said in section 4.1, contingently non-concrete entities and abstract individualities are generally introduced to provide actualism with the tools to make sense of the simplest QML. But the fragmentalist actualist can account for the truth of BF, NE, and BC *without including* such entities in her inventory. Let us see how.

Concretists usually interpret the operators ‘necessarily’ and ‘possibly’ as quantifiers over concrete worlds, that is, they take the evaluation of modal formulae as presupposing an explicit quantification over such concrete entities. Since the fragmentalist drops the idea that reality constitutes a unity with respect to the modal dimension, she is never in a



position to recover all the modal fragments at once. Still – from a semantic point of view – she is not compelled to reject such an interpretation of modal operators, in so far as she thinks of quantification over worlds as *fictional*. Taking quantification to be nothing but a metaphor is justified by the very metaphysical hypotheses about modality at the root of modal fragmentalism. Even though reality is indeed constituted by all the modal fragments in an absolute sense, from the current perspective no fact concerning quantification over worlds can obtain. While the concretist assumes that reality is genuinely unitary, to the fragmentalist actualist such an assumption is nothing but a helpful fiction: in evaluating BF, NE, and BC in a modal fragment  $w$  she will regard the objects belonging to all the other modal fragments – which, from the perspective centred on  $w$ , do not exist – as *mimicking* possibilia. She will offer – so to say – a pseudo-possibilist reading of such formulae. Thus, from the fact that it is possible that I have a daughter – by (the pseudo-possibilist interpretation of) BF – it will follow that there is a “possible” object which is my daughter; by ‘possible object’ she will refer to an entity located in a modal fragment different from the one in which BF is evaluated. NE will no longer be problematic either, for it will be read as simply stating that every object necessarily exists. In so far as our fragmentalist embraces

the fiction of a unified reality whose modal fragments contain possibilia, she does not need to hold that everything is necessarily actual. Analogously, in the light of the pseudo-possibilist interpretation of BC, the fact that the latter entails NE will force our actualist neither to reject it nor to enrich her ontology (with contingently concrete entities or abstract individualities). She will accept that objects can also bear properties in modal fragments in which they are mere “possible” things.

One might suspect that she is ultimately unable to account for the truth of such formulae. The objection would go as follows. Under the hypothesis that reality is irreducibly fragmented, the truth of a formula  $\varphi$  can be grounded in nothing more than the modal fragment in which  $\varphi$  is evaluated. Of course, this raises no problems in evaluating formulae that do not contain modal operators, that is, formulae that do not quantify over possible worlds. But what if  $\varphi$  is a modal formula? Granted: she can make sense of QML by taking quantification over worlds to be fictional. Still, she seems to lack the very *metaphysical* resources required to properly evaluate such a formula: she would need some sort of link between objects belonging to the modal fragment in which  $\varphi$  is evaluated and those belonging to all the other modal fragments (that is, the objects mimicking possibilia), whereas she can at most resort to the

grounding relation between  $\varphi$  and the single modal fragment in which it is evaluated.

Such a suspicion can be easily dispelled by distinguishing between the ground of a given truth and its supervenience base (so extending the strategy presented in section 1.4 to the modal case). From the perspective centred on the modal fragment we inhabit, nothing exists but actual entities, and so, for each true formula evaluated in our modal fragment, nothing but the modal fragment itself can function as a proper ground. The fact that the truth of BF, NE, and BC cannot be grounded in the modal fragment we inhabit does justice to the actualist intuition that existence is somehow limited to the realm of actual things. Nevertheless, the fragmentalist actualist can account for their truth by treating all the other modal fragments as its *supervenience base*. As I repeat, while the grounding relation between two facts,  $f_1$  and  $f_2$ , presupposes the fact that  $f_1$  is grounded in  $f_2$  (so requiring a metaphysical “bridge” between  $f_1$  and  $f_2$ ), supervenience is nothing but a modal correlation. In other words, in order for supervenience to hold between  $f_1$  and  $f_2$ , only their modal profiles are relevant, whereas grounding requires a further fact linking them. In particular, a supervenience base for the truth of  $\varphi$  is simply a set of facts S such that a change in the truth-value of  $\varphi$  requires

a corresponding change in  $S$ . Thus, no relational fact between  $S$  and the fact expressed by  $\varphi$  is required: supervenience can involve facts obtaining in different modal fragments, even though there is no trans-world fact able to bind them together.

Of course, our actualist has no need to distinguish between grounding and supervenience in analysing non-modal formulae, for the obvious reason that their evaluation does not require to take into account more than one modal fragment at once. Rather, the distinction is needed to account for the truth of a formula such as  $\Box\varphi$ . Consider a modal fragment  $w$ . Our fragmentalist will claim that, even though  $\Box\varphi$  cannot be grounded in  $w$ , its truth modally co-varies with the facts obtaining in all the other modal fragments. Namely, if  $\Box\varphi$  is true in  $w$ , reality will be constituted by no modal fragment  $w'$  such that  $\varphi$  is false in  $w'$ . Conversely, if  $\Box\varphi$  is false in  $w$  reality will be composed by at least one modal fragment  $w'$  such that  $\varphi$  is false in  $w'$ . Such a modal co-variation is precisely what we should expect if a supervenience link holds between the truth of  $\Box\varphi$  and the facts obtaining in all the other modal fragments.

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